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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

App. No.:	10/733,689	Att'y Docket:	EH-10964 (03-434)
Filing Date:	December 11, 2003	Conf No.:	8978
Inventor(s):	Scott A. Flatness et al.	Group Art Unit:	1746
Assignee:	United Technologies Corporation	Examiner:	B. Carrillo
Title:	DETONATIVE CLEANING APPARATUS		

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**Appeal Brief under 37 CFR 41.37(c)(1)**

This Appeal Brief is submitted in support of the Notice of Appeal which was filed on December 16, 2005.

(i) ***Real party in interest*** - The real party in interest for this Appeal is the Assignee of Record, United Technologies Corporation.

(ii) ***Related appeals and interferences*** – There are no known related interferences and no other related appeals.

(iii) ***Status of claims*** - The claims are as listed in the first amendment mailed June 13, 2005 and as set forth in the accompanying Appendix. Claims 1-13 were withdrawn, claims 13-23 were rejected, no claims were objected to, and no claims were allowed. Claims 12-23 are on appeal.

(iv) ***Status of amendments*** – A second amendment was filed October 17, 2005 responsive to the Office action made final of August 16, 2005 (hereafter the Office action) and was acted upon by the examiner in an Advisory Action mailed October 21, 2005. It was indicated that the amendment will not be entered for purposes of appeal and Appellants understand that amendment to have not been entered.

**(v) *Summary of claimed subject matter -***

The invention is drawn to a method for cleaning a surface (e.g., furnace tube bundles 70 of page 6, line 8 and FIG. 2 and other surfaces of page 1, line 6 et seq.) within an industrial equipment vessel (e.g., furnace 20 having a vessel wall 24 of page 5, lines 1-4 and FIG. 1 and other apparatus of page 1, line 6, et seq.) by removing a material (e.g., soot, ash, minerals, slag, and the like as described at page 1, line 10, et seq.). More particularly, the invention involves a method for using a combustion conduit (e.g., 26 of a soot blower 22 of page 3, line 8) to effect that cleaning.

The vessel has an aperture (e.g., 66 of FIG. 2 and page 2, line 3) in the wall.

For a plurality of cycles (cyclical operation at page 8, line 9-page 9, line 7): fuel and oxidizer (e.g., from fuel and oxidizer cylinders 34 and 36 of FIG. 1 and page 5, lines 15-18) are introduced to the conduit (e.g., page 7, lines 11 and 29 and page 8, lines 11 and 15); and a reaction of the fuel and oxidizer is initiated (e.g., page 18, line 22 using spark box initiator 50 of FIG. 1) so as to cause a shockwave (page 8, lines 27-28) to impinge upon the surface to at least loosen (page 8, lines 29-30) said material on the surface.

At least between the cycles a pressurized gas is introduced to the conduit effective to substantially resist upstream infiltration of a contaminant from an interior of the vessel (e.g., one embodiment involves a baseline flow of the same gas used for purging from an upstream end of the conduit as discussed at page 9, lines 5-7; a second embodiment, more relevant to the dependent claims, involves use of an air curtain flange 150 of FIGS. 6-8 or 184 of FIG. 16 and described from the last paragraph of page 10 through the penultimate paragraph of page 11).

**(vi) *Grounds of rejection to be reviewed on appeal -***

There are five (5) grounds of rejection to be reviewed on appeal as follows:

Ground 1 – The “new matter” rejection of claims 21 and 22 under 35 U.S.C. 112(1).

Ground 2 – The indefiniteness rejection of claims 13-23 under 35 U.S.C. 112(2).

Ground 3 – The 35 U.S.C. 102 rejection of claims 13-18 as being anticipated by Ruegg et al. (U.S. PGPub.2004/0112306).

Ground 4 – The 35 U.S.C. 103 rejection of claims 13-18 as being unpatentable over Plavnik et al. (U.S. Patent No. 6,684,823) in view of Ruegg et al.

Ground 5 – The 35 U.S.C. 103 rejection of claims 19-22 as being unpatentable over Ruegg et al.

**(vii) *Argument -***

**Ground 1 – Claims 21 and 22 do not incorporate new matter.**

Claim 21 identifies gas introduction "with a radially inward velocity component and a longitudinally downstream velocity component." At the paragraph numbered 2, the Office action asserted that the radially inward velocity component constituted new matter in that "the specification teaches 'off-radial'... [whereas] claim 21 is claiming 'radially inward'." Appellants submit that as a matter of basic geometry claim 21 neither incorporates new matter nor is indefinite nor suffers other statutory defect. As a matter of such basic algebra, "off-radial" does not preclude having a "radially inward velocity component" as long as there is at least one of a tangential and longitudinal component. This is clearly supported by the as-filed application.

For ease of reference, Appellants' further references are made to both the as-filed application and to the present PGPub. 2005/0126595 A1 which has slightly different paragraph numbering than the original unformatted specification. Present application paragraph 0038 (PGPub. 0040) identifies gas that "flows inward into the combustion conduit interior through the slots." *Emphasis added.* Claim 21 identifies the flow as having "a radially inward velocity component and a longitudinally downstream velocity component." Thus the exact flow is, by definition, off-radial (but still having an inward radial component according to basic geometry) and is therefore consistent with the passage cited in the Office action and is supported by paragraph 0038 (PGPub. 0040) as noted above and 0039 (PGPub. 0041) which recites "that the discharge outflow is off-radial (e.g., by an angle  $\theta$  so as to have a downstream longitudinal

component)." By definition, that flow also has a radial component and, therefore, the claims are fully supported by the as-filed specification and drawings (e.g., FIG. 16).

**Ground 2 - Claims 13-23 are not indefinite.**

Claim 13 was asserted as "indefinite because the preamble recites removing the material and the positive method steps only recite loosening the material." Office action, page 2, final paragraph.

A relevant portion of the application is at paragraph 0034 (0036 of the PGPub.). This identifies a shockwave "impinging upon the surfaces to be cleaned and thermally and mechanically shocking to typically at least loosen the contamination. The wave will be followed by the expulsion of pressurized combustion products from the detonation conduit, the expelled products and emerging as a jet from the downstream end 30 and further completing the cleaning process (e.g., removing the loosened material)." Clearly this comprehends situations both where the shockwave itself removes the contaminants and where the shockwave loosens the contaminants to facilitate their further removal (e.g., by the following combustion gas).

An attempt to identify the removal in the second amendment was improperly denied entry as raising a new issue. Nevertheless, the claim is believed perfectly definite as-is. There has been no showing that "those skilled in the art would [not] understand the scope of the claim when the claim is read in light of the rest of the specification." *Union Pac. Res. Co. v. Chesapeake Energy Corp.*, 236 F.3d 684, 692 (Fed. Cir. 2001). Clearly, the claim "is not insolubly ambiguous". *Marley Mouldings, Ltd. v Mikron Industries*, 417 F.3d 1356, 1361 (Fed. Cir.2005).

It was asserted that "it is unclear what is meant by a pressurized gas [sic] to substantially resist upstream infiltration of a contaminant." *Id.* However, the exact claim passage identifies "... introducing a pressurized gas to the conduit effective to substantially resist upstream infiltration of a contaminant from an interior of the vessel." This phrase is not indefinite. Examples of resistance to the upstream infiltration are discussed in paragraph 0040 (0042 of the PGPub.). Amendments to delete the term "substantially" and add the clarifying language "within the conduit" were not entered. Nevertheless, under the legal standards articulated above, the claim is believed definite as-is.

It was asserted that "it is unclear [sic] the structural relationship between the vessel and the conduit." *Id.* An amendment to further define the relative positioning of conduit and vessel was not entered. Nevertheless, under the legal standards articulated above, the claim is believed definite as-is.

Claim 15 was asserted as "indefinite because it is unclear what is meant by a major portion of [sic] air." *Id.* The claim clearly identified a majority of the gas as being air by using the standard English phrase "in major portion" not "a major portion of". Although entry of amendment was denied, the claim is believed definite as-is under the legal standards articulated above.

Claim 16 [presumed by Appellants to be 21] was asserted as "indefinite because it is unclear what is meant by a radially inward velocity component and a longitudinally downstream velocity component." Office action, sentence spanning pages 2 and 3. The text is believed clear in view of the specification at paragraph 0039 (PGPub paragraph 0041) and FIG. 16. In FIG. 16 (with the sheet viewed in landscape orientation) the radially inward direction from the holes 188 is downward (i.e., toward the caption "FIG. 16"). The longitudinally downstream direction is leftward (i.e., toward FIG. 8). In FIG. 16, if the holes 188 were rotated approximately 30° counterclockwise, they would be oriented approximately directly radially inward (i.e., the gas would have no longitudinal upstream or downstream component). If rotated further, the gas would have a longitudinal upstream component. This is basic geometry. Accordingly, no amendment is believed required. The examiner was invited to contact the undersigned if she believed any specific amendment would be advantageous but did not. Again, in view of the foregoing, the claim is believed clearly definite as-is.

Claim 16 was asserted as "indefinite because if the flowpath length within the conduit is not known, how can one determine 20% of the length." Office action, page 3, first paragraph. Appellants are uncertain why the examiner asserted that the flowpath length within the conduit is unknown. This would be the length from the conduit inlet to the conduit outlet which would be known. Appellants note that the flowpath may extend beyond the conduit (i.e., the flow of discharged gases may continue from the outlet to locations in the interior of the vessel). The examiner was invited to propose any specific amendment believed appropriate but declined. Nevertheless, under the legal standards articulated above, the claim is believed definite as-is.

Claims 17 and 18 were asserted as "indefinite because the gas lacks fuel only prior to being introduced into the conduit." *Id.* This statement is, itself, unclear to Appellants. In alternative ways, these two claims distinguish hypothetical situations wherein the claimed pressurized gas might be asserted as being the oxidizer and/or the fuel (either of which themselves might be gaseous). For example, when air is the pressurized gas it may be introduced without fuel (even if an additional supply of air is also used as the oxidizer). Similarly, claim 18 would cover a situation where nitrogen or inert gas is used as the pressurized gas and air is used as the oxidizer. The examiner was invited to contact the undersigned to discuss but declined to. Nevertheless, under the legal standards articulated above, the claims are believed definite as-is.

As noted above, the meaning of the claims was sufficiently clear that the proposed amendments were merely of a formal nature. Even if any asserted indefiniteness would otherwise be upheld under a high standard of definiteness, the meaning of the claims was sufficiently clear that the examiner should have proposed or entertained amendments to provide that definiteness. Thus, in lieu of affirming rejection on any of the other grounds, the application should be remanded for entry and consideration of the unentered amendment.

**Ground 3 - Claims 13-18 are not anticipated by Ruegg et al.**

Paragraph 45 of Ruegg et al. was cited as identifying an air purge. This paragraph specifically recites use of compressed air to clean the inner pipe 22 "of the residues of the explosion..." Specifically, Ruegg et al. shows a compressed air tank 42 introducing the compressed air at the upstream end of the inner pipe 22 of FIG 2. The downstream end of that pipe is connected to a "thin-walled container 25." Thus, the container 25, itself, appears to prevent the upstream infiltration of contaminants. Accordingly, the function of the Ruegg et al. air would be limited to purging the conduit into the container and not resisting upstream infiltration of a contaminant.

Clearly, Ruegg et al. fails to disclose the particular location of claim 16. Instead, Ruegg et al. teaches the most upstream of compressed air introduction.

Regarding claim 18, the Ruegg et al. purge gas (air) is the same as its oxidizer.

**Ground 4 - Claims 13-18 are not unpatentable over Plavnik et al. in view of Ruegg et al.**

(a) Introduction

The rejection is a mere hindsight reconstruction of apparatus elements of the rejected independent claim with substantial unsuggested reconfiguration. No proper motivation has been provided for the proposed combination of apparatus elements. Moreover, there is no citation or motivation for the claimed method elements or for apparatus and method elements of various dependent claims. Improper, unreasonable, assertions of indefiniteness appear as excuses for failure to consider clear claim limitations.

(b) The Basic Combination of References

As noted above, Ruegg et al., and thus the proposed combination, fails to suggest the use of pressurized gas to resist upstream infiltration of a contaminant.

There also is no suggestion for the particular location of claim 16. Although it was asserted as being well known "to purge any system for purposes of removing contaminants", the Office action apparently did not consider the upstream infiltration element due to the asserted indefiniteness. This failure is improper because the claim is definite.

Regarding claims 16 and 19, Plavnik et al. was asserted as teaching "different embodiments in which air is introduced along different lengths of conduit." Office action, page 5, final paragraph. No specific citation was made for introduction in the presently-claimed longitudinal location of claim 16 and circumferential locations of claim 20. Nothing in Plavnik et al. suggests these locations. For example, the Ruegg et al. air introduction appears as upstream single-point for each conduit.

Regarding claims 17 and 18, reference was merely made to Ruegg et al. which has been addressed above as failing to suggest the claimed subject matter.

Regarding claims 20-22, it was merely asserted to "have been within the level of the skilled artisan to introduce the gas in any desired manner in order to effectively remove and thereby clean the system of residual contaminants." Office action, spanning pages 5 and 6. However, there is no suggestion that the desired manner would be the presently-claimed manner. For example, there would be no suggestion for anything more than a single-point, non-continuous purge, if even that.

Regarding claim 23, reference was merely made to Plavnik et al. However, there is clearly no suggestion in Plavnik et al. for introducing the pressurized gas supplemental to any

purge flow. As noted above, Ruegg et al. and thus the combination, only teaches a purge flow, not a supplemental flow.

**Ground 5 - Claims 19-22 are not unpatentable over Ruegg et al.**

The Office action asserted that "it would have been within the level of the skilled artisan to introduce the gas in any desired manner in order to effectively remove and thereby clean the system of residual contaminants." Office action at paragraph 11. There is no suggestion that the presently-claimed manner would have been desired by one of ordinary skill in the art.

There is no indication that one of ordinary skill in the art implementing the purge cleaning role of Ruegg et al. would form the curtain of claim 19 let alone have the continuous introduction of claim 20 (clearly contrary to the limited cleaning purge of Ruegg et al).

There is further no suggestion for the radially inward and tangential velocity components of claims 21 and 22.

**Conclusion**

Each of the claims as set forth above clearly contains allowable subject matter. It is respectfully submitted that these rejections are in error.

Reversal of the rejection of these claims is therefore earnestly solicited.

**(viii) *Claims appendix*** - Attached is a Claims appendix containing all claims in the application and which form the basis for this appeal.

**(ix) *Evidence appendix*** - Attached is an Evidence appendix showing relevant drawing figures of the cited references.

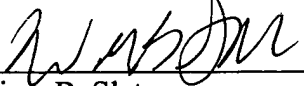
**(x) *Related proceedings appendix*** - None.

Appellants request that the fee for filing this Appeal Brief be charged to Deposit Account No. 21-0279. Please charge any deficiencies or additional fees which may be required hereunder and credit any overpayments to Deposit Account No. 21-0279.



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Appn. No. 10/733,689  
Mailed February 16, 2006

Respectfully submitted,

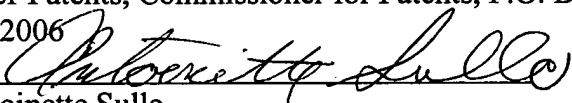
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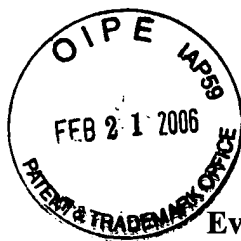
  
Antoinette Sullo

## Claims Appendix

### Listing of Claims:

13. A method for cleaning a surface within an industrial equipment vessel by removing a material, the vessel having a wall with an aperture therein, the method comprising:  
for a plurality of cycles:  
introducing fuel and oxidizer to a conduit; and  
initiating a reaction of the fuel and oxidizer so as to cause a shockwave to impinge upon the surface to at least loosen said material on the surface; and  
at least between said cycles introducing a pressurized gas to the conduit effective to substantially resist upstream infiltration of a contaminant from an interior of the vessel.
14. The method of claim 13 wherein:  
the reaction of the fuel/oxidizer mixture comprises a deflagration-to-detonation transition.
15. The method of claim 13 wherein:  
the gas comprises in major portion air.
16. The method of claim 13 wherein:  
the gas is introduced through a gas port in a downstreammost 20% of a flowpath length within the conduit.
17. The method of claim 13 wherein:  
the gas lacks said fuel.
18. The method of claim 13 wherein:  
the gas is different from said oxidizer.
19. The method of claim 13 wherein:  
the gas is introduced at a plurality of circumferential locations to form a curtain of gas.

20. The method of claim 13 wherein:  
the gas is introduced continuously.
21. The method of claim 13 wherein:  
the gas is introduced with a radially inward velocity component and a longitudinally downstream velocity component.
22. The method of claim 21 wherein:  
the gas is introduced with a tangential velocity component.
23. The method of claim 13 wherein:  
the gas is supplemental to a purge flow introduced separately.



Evidence Appendix

Ex. 1 Ruegg et al. FIG. 2

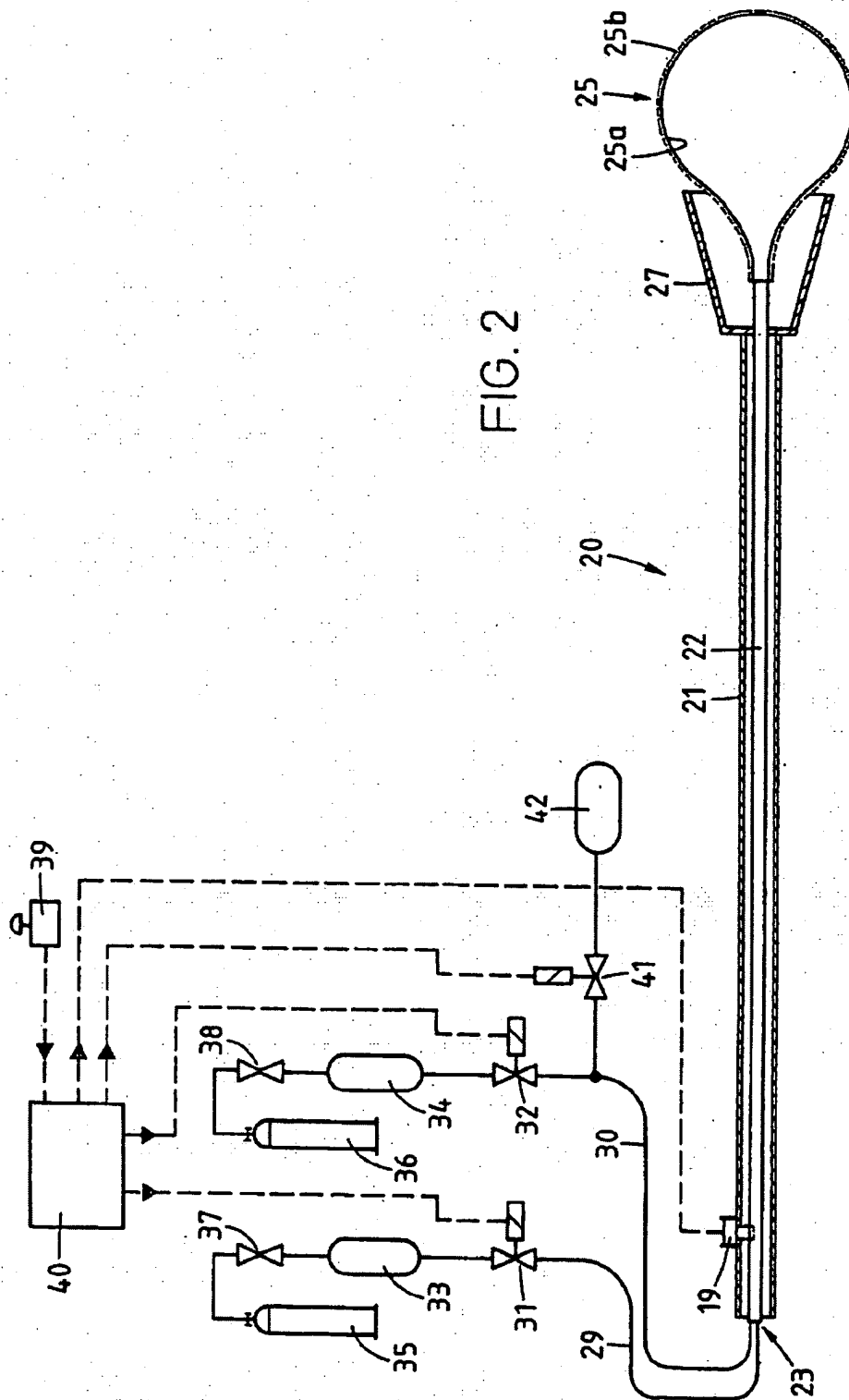


FIG. 2



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**Related Proceedings Appendix**

None